

Amendments to the Claims

This listing of claims will replace all prior versions and listings of claims in the subject application:

Listing of Claims:

1. (Original) In a photoelectrochemical cell having at least one semiconductor photoelectrode, a second electrode and an electrolytic solution disposed there between, the improvement comprising:

a housing enclosing said photoelectrochemical cell, said housing comprising at least one light transmissive wall, said light transmissive wall and said at least one semiconductor photoelectrode forming a space there between, said space containing substantially no said electrolytic solution;

said at least one semiconductor photoelectrode comprising a proton exchange membrane having an electrolyte facing surface in contact with said electrolytic solution and a light transmissive wall facing surface; and

a photo electro-catalyst disposed on said light transmissive wall facing surface.

2. (Original) A photoelectrochemical cell in accordance with Claim 1, wherein said second electrode is a semiconductor photoelectrode.

Serial No.: 10/617,466

3. (Original) A photoelectrochemical cell in accordance with Claim 2, wherein each of said semiconductor photoelectrodes comprises at least one wide band gap semiconductor.

4. (Original) A photoelectrochemical cell in accordance with Claim 3, wherein said at least one wide band gap semiconductor is a p-type semiconductor comprising TiO_2 .

5. (Original) A photoelectrochemical cell in accordance with Claim 3, wherein said at least one wide band gap semiconductor is an n-type semiconductor comprising TiO_2 .

6. (Original) A photoelectrochemical cell in accordance with Claim 3, wherein said at least one wide band gap semiconductor comprises carbon black.

7. (Currently amended) A photoelectrochemical cell in accordance with Claim 6, wherein said at least one wide band gap semiconductor comprises a Nafion perfluorosulfonic acid polymer emulsion binder.

Serial No.: 10/617,466

8. (Original) A photoelectrochemical cell in accordance with Claim 3, wherein said at least one wide band gap semiconductor comprises at least one electrically conductive polymer.

9. (Original) A photoelectrochemical cell in accordance with Claim 8, wherein said at least one electrically conductive polymer is selected from the group consisting of polyaniline, polypyrrole and combinations thereof.

10. (Original) A photoelectrochemical cell in accordance with Claim 8, wherein said at least one electrically conductive polymer is at least partially sulfonated.

11. (Original) A photoelectrochemical cell in accordance with Claim 3, wherein said at least one wide band gap semiconductor comprises one of an electron conductive polymer and a proton conductive polymer.

12. (Currently amended) A photoelectrochemical cell in accordance with Claim 1, wherein said light transmissive wall is made of a material selected from the group consisting of glass and ~~plexiglas~~ a transparent, acrylic material.

Serial No.: 10/617,466

13. (Original) A photoelectrochemical cell in accordance with Claim 1 further comprising a metallic connector suitable for connecting said photoelectrochemical cell to another photoelectrochemical cell.

14. (Currently amended) A photoelectrochemical cell comprising:
a light transmissive enclosure;
a semiconductor photoanode disposed within said light transmissive enclosure;
a semiconductor photocathode disposed within said light transmissive enclosure; and
at least one of said semiconductor photoanode and said semiconductor photocathode disposed at a distance from a wall of said light transmissive enclosure, forming a space between said at least one of said semiconductor photoanode and said semiconductor photocathode and said wall; and
an electrolytic solution disposed entirely between said semiconductor photoanode and said semiconductor photocathode.

15. (Original) A photoelectrochemical cell in accordance with Claim 14, wherein each of said semiconductor photoanode and said semiconductor

Serial No.: 10/617,466

photocathode comprises a proton exchange membrane having an electrolytic solution facing surface in contact with said electrolytic solution and a light transmissive enclosure facing surface, and a semiconductor layer disposed on said light transmissive enclosure facing surface.

16. (Original) A photoelectrochemical cell in accordance with Claim 15, wherein said semiconductor layer comprises at least one wide band gap semiconductor.

17. (Original) A photoelectrochemical cell in accordance with Claim 16, wherein said at least one wide band gap semiconductor is a p-type semiconductor.

18. (Original) A photoelectrochemical cell in accordance with Claim 16, wherein said at least one wide band gap semiconductor is an n-type semiconductor.

Serial No.: 10/617,466

19. (Original) A photoelectrochemical cell in accordance with Claim 16, wherein said at least one wide band gap semiconductor comprises carbon black.

20. (Currently amended) A photoelectrochemical cell in accordance with Claim 19, wherein said at least one wide band gap semiconductor comprises a ~~Nafion~~ perfluorosulfonic acid polymer emulsion binder.

21. (Original) A photoelectrochemical cell in accordance with Claim 16, wherein said at least one wide band gap semiconductor comprises at least one electrically conductive polymer.

22. (Original) A photoelectrochemical cell in accordance with Claim 21, wherein said at least one electrically conductive polymer is selected from the group consisting of polyaniline, polypyrrole and combinations thereof.

23. (Currently amended) A ~~photoelectricochemical~~ photoelectrochemical cell in accordance with Claim 21, wherein said at least one electrically conductive polymer is at least partially sulfonated.

Serial No.: 10/617,466

24. (Original) A photoelectrochemical cell in accordance with Claim 16, wherein said at least one wide band gap semiconductor comprises one of an electron conductive polymer and a proton conductive polymer.

25. (Currently amended) A photoelectrochemical cell in accordance with Claim 15, wherein said light transmissive wall is made of a material selected from the group consisting of glass and ~~plexiglas~~ a transparent, acrylic material.

26. (Original) A photoelectrochemical cell in accordance with Claim 15 further comprising a metallic connector suitable for connecting said photoelectrochemical cell to another photoelectrochemical cell.